

Work Order ID 59172

Thursday, May 27, 2010 12:36:16 PM



Page 1

Item ID: D350-748-201

Accept



Setup Start



Revision ID:

Item Name: Crosstube Installation, High Aft

Stop



Start Date: 5/27/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 6/11/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: 14 Date: 105-27 Tooling:

Date:

Run Start



QC: _____ Date: _____ SPC (Y/N): _____

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-241	Rev E								

100



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile & type labels per PPPD350-748-201

CHG001

0.00

0.00

110



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

0.00

0.00

120



QC

Quality Control

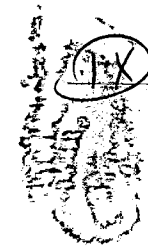
QC15- Crosstube Dimensional Check

Memo

0.00

0.00

8/10/06/09



MB 10-06-08



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-241

4-Remove all marks from tube within limits of D350-748-241

5- Apply a light coat of LPS3 on the interior of tube

Batch:

107956

AWM 10-06-09

140



QC

Quality Control

QC6- Inspect dimensions to drawing

0.00

Memo

0.00

10/06/10

AWM

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Required Date: 6/11/2010 Req'd Qty: 1.00



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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
Outsource3	Memo	0.00							
Outsource process - Cad plate	Issue P/O: <u>12062</u> Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached								
160 	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformity is attached								
170 	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

C2 10/6/21 ①

Pho →

10/8/10 SP P2

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: 0350-748-201 PAR #: Fault Category: x tubes NCR: Yes No DQA: Date: 10/08/26
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: Date: 10/09/01

NCR: S9172		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
10/08/26	#12	Tube cracks AT MP II inspection. R.C. Process.	<u> </u> 10/08/26 21042	-Scrap + Destroy no replace replace	SAD 10-09-01	<u> </u> 10-9-1	<u> </u> 10/08/26 21042	<u> </u> 10/08/26

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Start Date: 5/27/2010 Start Qty: 1.00

Required Date: 6/11/2010 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 S SprayPaint Spray Painting	SprayPaint Memo 1-Prime inside crosstube as per QSI 005 4.2 2-Paint Outside of Tube as per Dart QSI 005 4.2	0.00 0.00							
190 QC Quality Control	QC14- Inspect Spray Paint Memo Then, Wrap in plastic bag to protect from scratches	0.00 0.00							
200 Crosstubes Crosstubes	Crosstubes Memo 1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-241 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS	0.00 0.00							

SCRAP

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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 6/11/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210 	QC5- Inspect part completeness to step on W/O	0.00							
QC Quality Control	Memo	0.00							
220 	Pick Kit	0.00							
Packaging Packaging	Memo	0.00							
230 	QC4- 100% Inspect kits for completeness	0.00							
QC Quality Control	Memo	0.00							

Scrap

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Start Date: 5/27/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 6/11/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

240

0.00



Packaging

Packaging

Memo

0.00

Identify and pack for shipping as per PPPD350-748-201

Location: _____

PPP Rev: _____

250

0.00



QC21- Final Inspection - Work Order Release

QC

Memo

0.00

Quality Control

*Scrap**mf
10-9-1*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

Picklist Print

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Page 1

Work Order ID: 59172

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Comments: IPP Rev: A New Issue 06-07-05 JLM
IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Date: 5/27/2010

Required Date: 6/11/2010

Start Qty: 1.00

Required Qty: 1.00

D350-748-241TRN

Manufactured No

110

Each

1.0000

1

1



Crosstube Turning Detail

B-47166 MR 10-06-08

Location

Loc Qty

Loc Code

LG

1

47170

1

ALS4-1032-225

Purchased

No

200

Each

7,062.000

1

1



Insert

Location

Loc Qty

Loc Code

PK011

7062

110768

7062

AN960JD10

NAS1149D0363J

Purchased

No

200

Each

0.0000

1

1



Washer

D2856-400

Manufactured

No

200

f

269.1088

1.181

1.243158



Abraison Strip

Location

Loc Qty

Loc Code

ST403

269.1088

50593

62.0568

56626

207.052

1- cut as per dwg D2856

W/O:		WORK ORDER CHANGES					
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Start Date: 5/27/2010

Required Date: 6/11/2010

Comments: IPP Rev: A New Issue 06-07-05 JLM
 IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

D3502-1

Manufactured No

200

Each

67.0000

2

2



Support

Location

Loc Qty

Loc Code

ST066

67

47120

1

50287

38

52903

28

200

Each

111.0000

2

2

MS21920-20

Purchased

No



Clamp (per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

11

112307

2

112624

32

112793

3

114687

50

114779

24

200

Each

150.0000

1

1

MS27039-1-10

Purchased

No



Screw

Location

Loc Qty

Loc Code

ST291

150

112794

50

112940

100

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Shop Packet Print

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Start Date: 5/27/2010

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IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

AN4-41A	Purchased	No	220	Each	134.0000	8	8
							
Bolt							
<hr/>							
		<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>	
		ST360		134			
		110731		2			
		111424		26			
		112082		6			
		113359		100			
AN4-6A	Purchased	No	220	Each	926.0000	16	16
							
Bolt							
<hr/>							
		<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>	
		ST356		926			
		112933		96			
		113149		600			
		114523		30			
		114615		200			
AN5-32A	Purchased	No	220	Each	186.0000	4	4
							
Bolt							
<hr/>							
		<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>	
		ST340		186			
		113121		36			
		114056		100			
		114405		50			
AN960JD416	NAS1149D0463J Purchased	No	220	Each	0.0000	32	32
							
Washer							

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Page 3

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 IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

AN960JD516	NAS1149D0563J	Purchased	No	220	Each	0.0000	8	8
Washer								
D3500-1		Manufactured	No	220	Each	36.0000	4	4
Saddle								
<div> <div>Location</div> <div>ST425</div> <div>47119</div> <div>52326</div> <div>55605</div> </div> <div> <div>Loc Qty</div> <div>36</div> <div>1</div> <div>9</div> <div>26</div> </div> <div> <div>Loc Code</div> <div></div> <div></div> <div></div> <div></div> </div>								
D3501-1		Manufactured	No	220	Each	479.0000	16	16
Bushing								
<div> <div>Location</div> <div>ST066</div> <div>45402</div> <div>45918</div> <div>48268</div> <div>53779</div> </div> <div> <div>Loc Qty</div> <div>479</div> <div>16</div> <div>159</div> <div>204</div> <div>100</div> </div> <div> <div>Loc Code</div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>								

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Comments:

IPP Rev: A New Issue 06-07-05 JLM

Start Qty: 1.00

Required Qty: 1.00

IPP Rev: B Update qty of MS21042L5 06-09-12 KJ

IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD

IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

MS21042L4

Purchased

No

220

Each

2,605.000

24

24



Nut

Location

Loc Qty

Loc Code

ST139

2

111827

2

ST300

2603

113422

80

114523

1515

114718

1000

9063

8

MS21042L5

Purchased

No

220

Each

515.0000

4

4



Nut

Location

Loc Qty

Loc Code

ST300

515

113523

12

113537

3

114437

100

114449

400

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

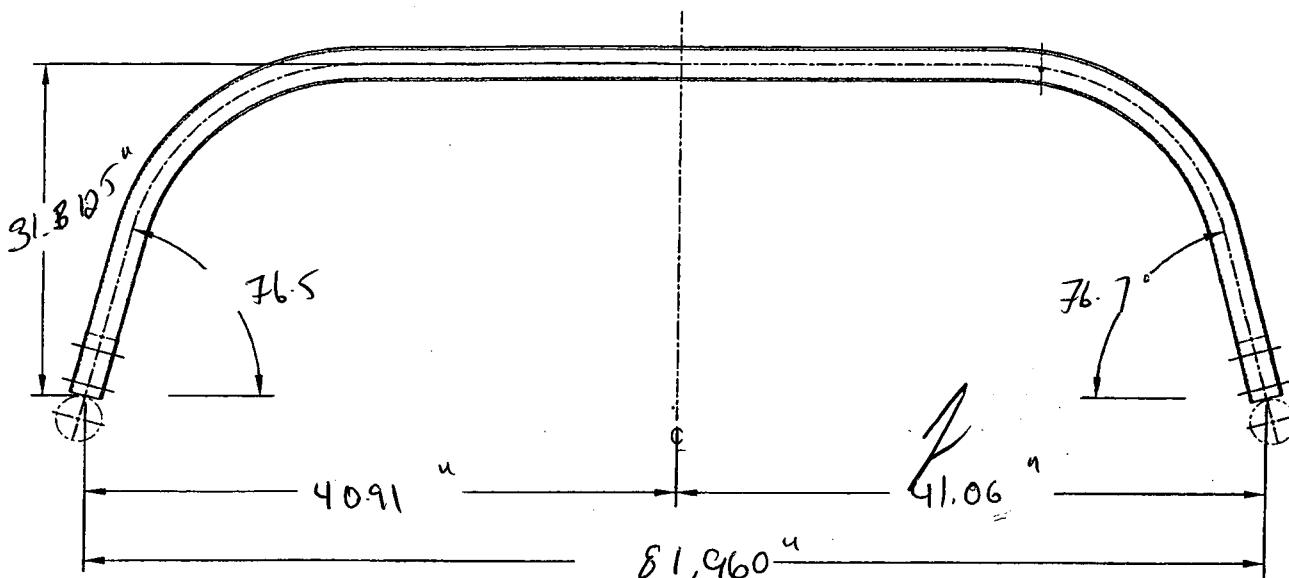
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	59172
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241	Rev: <i>10/06/09</i>	Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
twist = $0.153''$ \rightarrow Acceptable <i>10/06/09</i>

QC15 Inspection	<i>10/06/09</i>
Date	<i>10/06/09</i>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM <i>10/06/09</i>	<i>10/06/09</i>

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6018-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6018-125
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO.

59172
BJ10-5-27

RELEASED
2009-10-29

E	REVISE GENERAL NOTES: UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-241	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

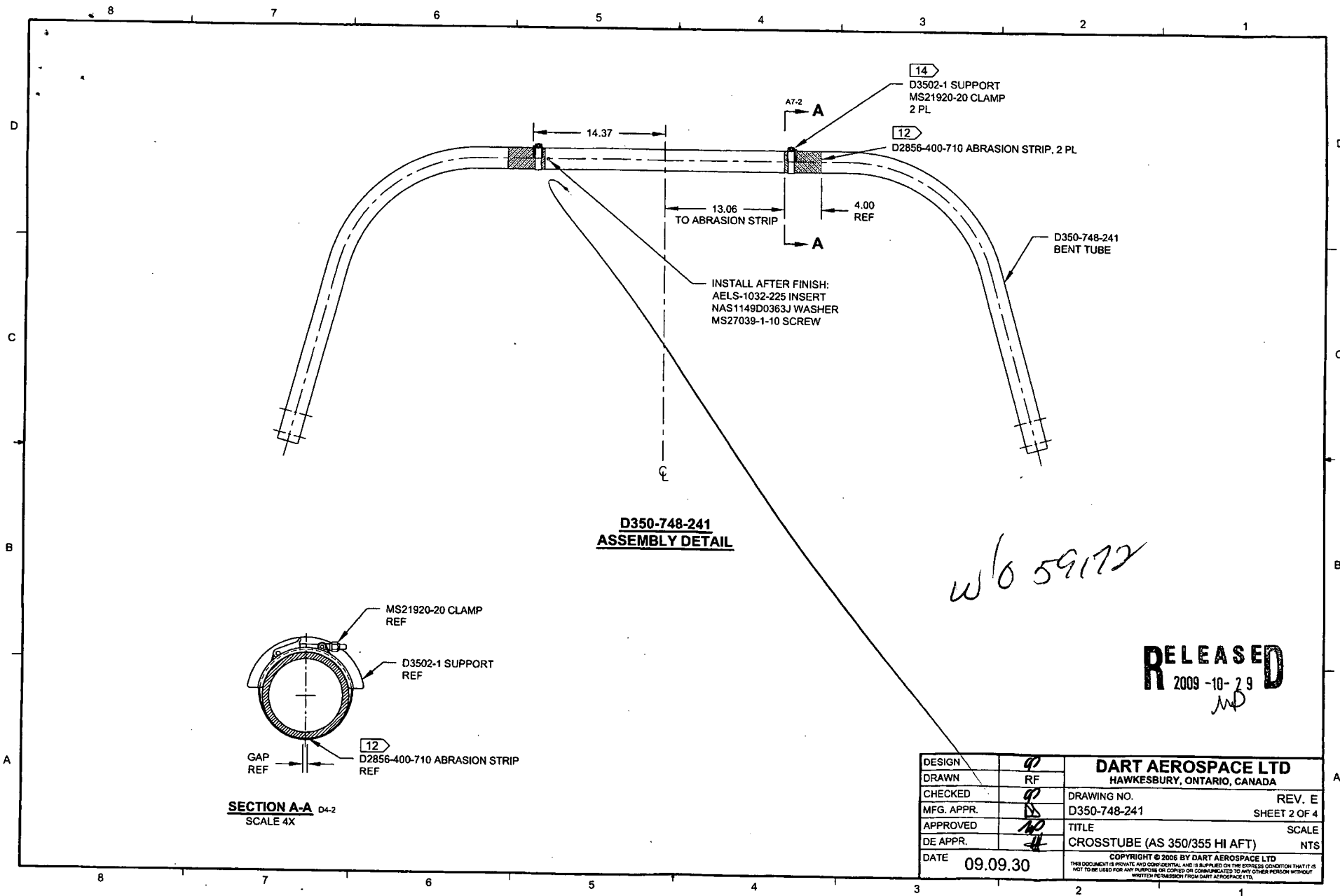
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



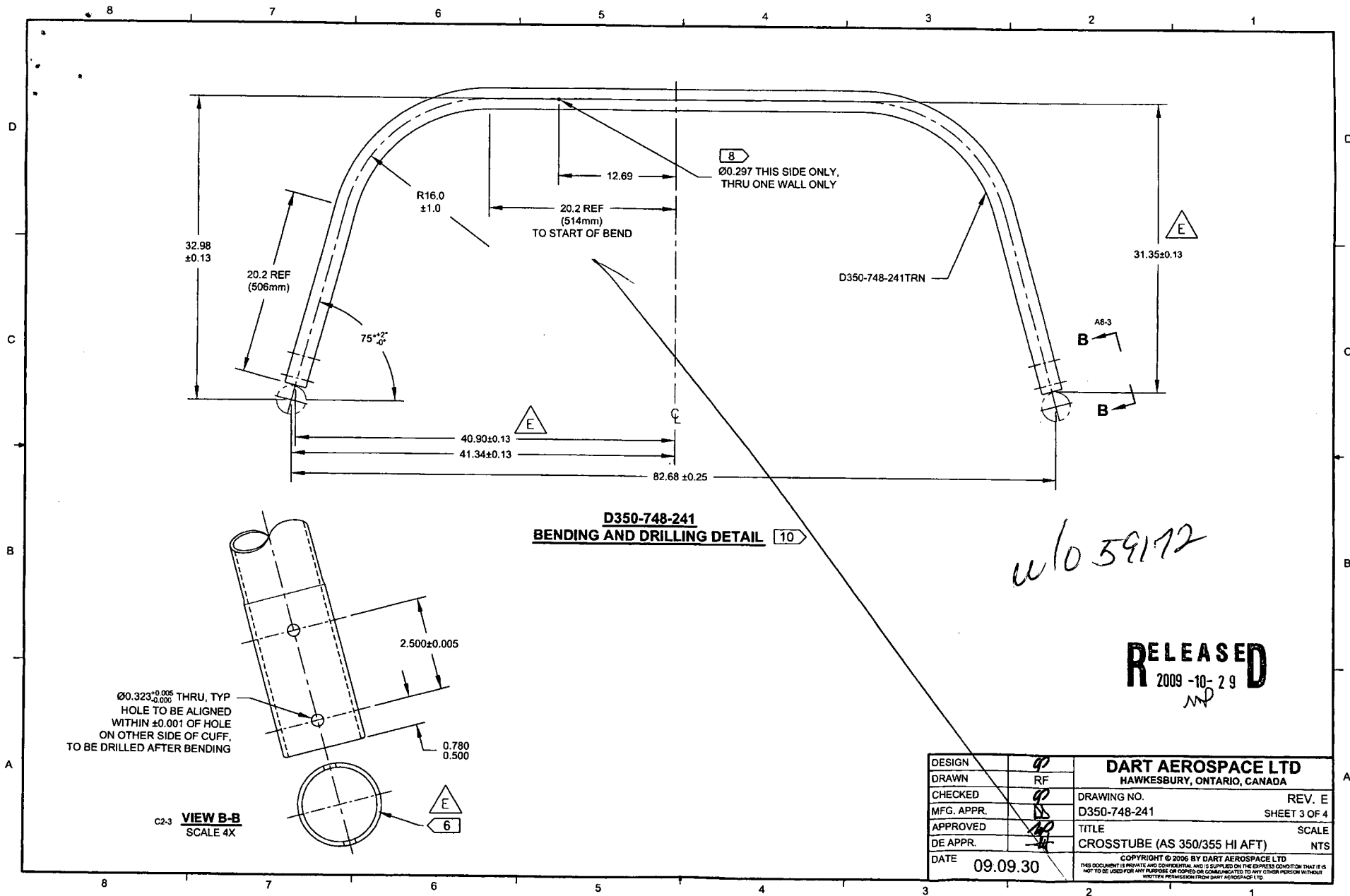
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jul-05-2010

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 96460

INVOICE #: 50229

**CONTRACT OR
PURCHASE ORDER #**

12062

DESCRIPTION: SKID

QTY 1

P/N # D350-748-201

S/N # B59172

**STRESS RELIEF HEAT CHART #10-634. MPI IAW ASTM-E-1444.
CADMIUM PLATE IAW AMS-QQ-P-416B TYPE 2 YELLOW CLASS 1.
BAKE HEAT CHART # 10-686.**

tube cracked @ MPI!

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:

